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DRINKING WATER SOURCE PROTECTION PLAN

Arches National Park
Devils Garden Well

August 2001

WATER RESOURCES DIVISION

NATIONAL PARK SERVICE

National Park Service - Department of the Interior
Fort Collins - Denver - Washington

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DRINKING WATER SOURCE PROTECTION PLAN

Arches National Park
Devils Garden Well

August 2001

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WATER RESOURCES DIVISION

National Park Service - Department of the Interior
Fort Collins - Denver - Washington

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EXECUTIVE SUMMARY

The well at Devils Garden, Arches National Park supplies water for a transient, non-community water system. The well provides water for visitor uses at a campground, ranger office, and popular hiking trailhead. The primary uses of the water are drinking water and comfort stations. The water system is operated year round.

The well at Devils Garden is a deep well. Initially, (1962) the well was drilled to 900 feet. In 1966, the well was deepened to 1100 feet to increase the yield. The primary aquifer supplying water to this well is the Wingate Formation, a fine-grained sandstone.

There are no other deep wells within 12 miles of Devils Garden. Available information does not allow us to delineate the area of groundwater flow to the well for various travel times, as prescribed by Utah Division of Drinking Water. Hydrologic data is inadequate to determine even the direction of groundwater flow. Therefore, we used the optional two-mile radius for developing this drinking water source protection plan.

There are few potential contaminants in the area. All potential contaminant sources in the area are under the direct control of the National Park Service.

The following procedures are recommended to reduce the potential for contamination of the ground-water resource and drinking water supply at the Devils Garden area of Arches National Park.

1. Continue leak detection monitoring at the diesel fuel storage tank.
2. Continue periodic inspection of areas where paint, solvents, etc. are stored in the maintenance area.
3. Purchase paint, solvents, etc. on an as-needed basis to reduce quantities stored on site.
4. Provide secondary containment for all potential contaminants.

1.0 INTRODUCTION

Arches National Monument was created in 1929. In 1971, the park was enlarged and designated Arches National Park. In 1998, the Lost Spring Canyon area (3140 acres) was added to the park. Arches National Park was set aside to preserve and protect more than 2000 natural sandstone arches and a variety of other unique geological features. Arches National Park includes 76,519 acres. Annual visitation is approximately 870,000 persons.

The Devils Garden area of Arches National Park is about 14 miles north of Moab, Utah. The general location is shown on the map in Figure 1.

1.1 System Information

National Park Service
Arches National Park
Utah DEQ Number 10022

This is a transient, non-community public water supply system. The well was originally constructed in 1962 to a depth of 900 feet. In 1966, the well was deepened to 1100 feet to increase the yield. Water is obtained from the Wingate Formation, a fine-grained sandstone.

1.2 Source Information

The well at Devils Garden was constructed in 1962 and deepened in 1966. Total depth of the well is 1100 feet. A copy of the well log is included in the appendices of this report. The well was constructed by drilling an 8-inch borehole with 6-inch steel casing perforated from 819-900 feet. In 1966, the well was deepened to 1100 feet. It appears that open-hole construction was used to deepen the well. A cement surface seal was

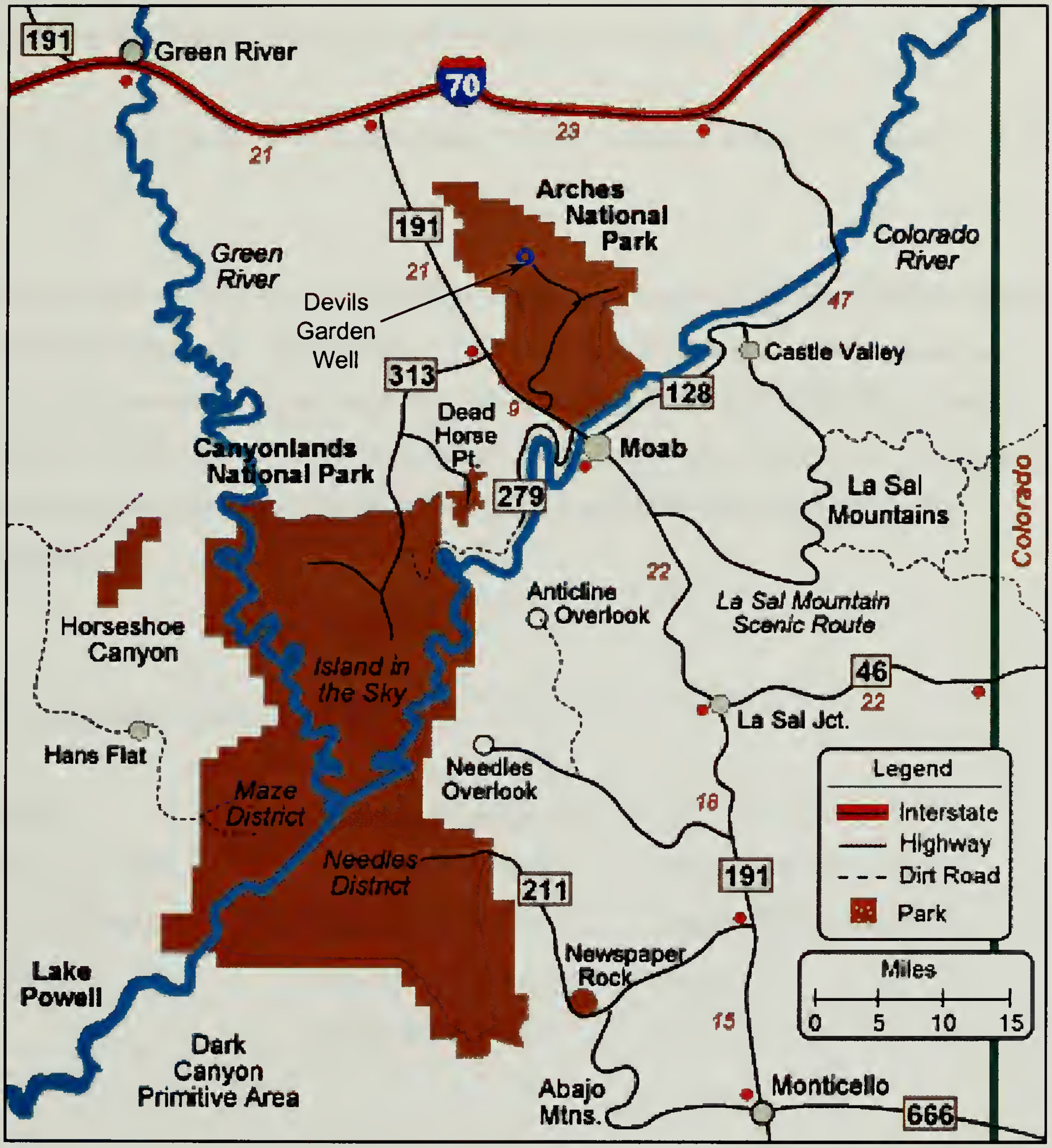


Figure 1. General Location Map

placed from 8 feet deep to the surface. Static water level was about 755 feet below ground surface (1962). We have no record of drawdown and recovery tests for this well. The well, with its current pump, produces 11-12 gpm.

The legal description of the well location is; NW¼ of NE¼ of SW¼, Section 27, T23S, R21E SLBM.

Water is used for drinking and restroom facilities by park visitors and staff at the Devils Garden Campground and trailhead. There is a Ranger Station at Devils Garden. Water use generally ranges from about 60-80,000 gallons per month from March-October. Water use at Devils Garden for 1991-98 is shown in Figure 2. New water lines were installed below the frost line in 2001 to allow year round use of the campground.

1.3 Designated Person - R309-113-5:

Owner:	National Park Service	
Superintendent:	J. Rockford Smith	Phone: (435)-719-2100
Facility Manager:	Rodney Robey	Phone: (435)-719-2250
Address:	2822 South West Resource Blvd. Moab, UT 84532	

2.0 THE DELINEATION REPORT - R309-113-9(5)

The primary sources of hydrogeologic information for this report are unpublished reports, memos, and other documents in the files of the National Park Service Water Resources Division in Ft. Collins, Colorado. Two unpublished reports, Lofgren (1954)

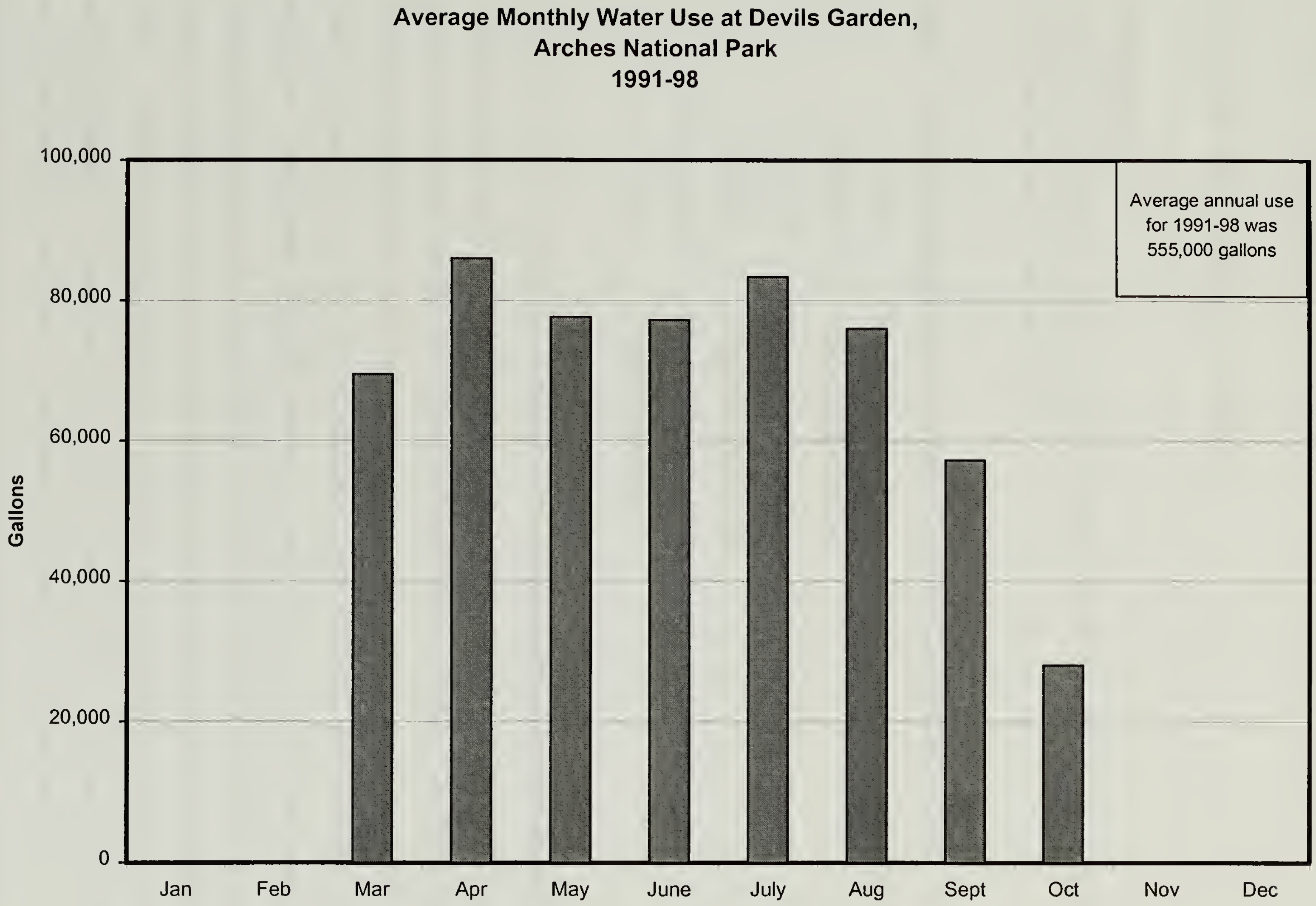


Figure 2. Average monthly water use.

and Arnow (1963), describe the hydrogeology of the area and construction of the well. There are no other water supply wells within several miles of the site.

2.1 Geologic Data - R309-113-9 (5)(a)(i)

Hydrogeology

Geologic formations, based on the interpretation of Arnow (1963), encountered during drilling the well are shown in Table 1.

Table 1. Geologic formations encountered in drilling Devils Garden Well.

0-210'	Slick Rock and Dewey Members of Entrada Sandstone
210-540'	Navajo Sandstone
540-765'	Kayenta Formation
765-900'	Wingate Sandstone
900-1100	Presumed to be Wingate Formation
GT 1100'	Chinle Formation

The fins and other sandstone outcrops in the Devils Garden area are formed by the Slick Rock Member of the Entrada Sandstone. The Slick Rock Member is primarily a fine-grained sandstone dipping to the northeast (Arnow, 1963). The Slick Rock Member is underlain by the Dewey Bridge Member of the Entrada Sandstone. The Dewey Bridge Member consists of siltstone, sandy siltstone, and very-fine-grained sandstone. The Dewey Bridge Member is relatively impermeable and acts as a barrier to downward percolation of groundwater. Numerous springs occur at the contact between the Slick Rock and Dewey Bridge Members of the Entrada Sandstone (Arnow, 1963). The Dewey Bridge Member is underlain by the Navajo sandstone, a fine-to-medium grained sandstone which is relatively permeable. The Navajo Sandstone was dry in the Devils Garden area. The Navajo Sandstone is underlain by the Kayenta Formation, consisting of thin sandstones interbedded with shale. The Kayenta is relatively impermeable and acts as a barrier to downward percolation of groundwater.

The Kayenta is underlain by the Wingate Sandstone, which consists of fine-grained sandstone. Although fine-grained, the Wingate is poorly cemented, and it does transmit groundwater (Arnow, 1963). The well was deepened in 1966 in anticipation of finding additional groundwater at the contact between the Wingate Sandstone and the underlying Chinle Formation. We do not have information from 1966 to indicate whether the deepening of the well resulted in intersecting the contact between the Wingate and Chinle Formations, or if the increased yield of the well was a result of penetrating an additional 200 feet of Wingate Sandstone.

Water Quality

Water quality data for the Devils Garden Well are summarized in Table 2. Water is chlorinated and stored in a 30,000-gallon storage tank located in the campground. The storage tank was abrasively cleaned, inside and outside, and repainted in 2001. The water is hard, but otherwise is acceptable for a public water supply.

Table 2. General water quality, Devils Garden Well

Date	4/12/84	3/24/87	5/16/88	6/17/91
pH	7.8	7.9	8.3	8.0
Turbidity, NTU	0.6	0.3	0.7	0.2
Spec. Cond. (umhos)	525	503	514	499
Hardness ($CaCO_3$)	184	213	180	192
TDS (mg/l)	268	282	302	280
Ca (mg/l)	27	31	26	29
SO_4 (mg/l)	36	38	36	38
Cl (mg/l)	36	36	37	36
NO_3 (mg/l)	0.78	0.77	0.79	0.78
Arsenic (mg/l)	0.0025	<0.0011	<0.001	<0.005
Cadmium (mg/l)	<0.001	<0.001	<0.001	<0.001
Iron (mg/l)	<0.03	0.02	0.05	<0.02
Manganese (mg/l)	0.015	0.005	0.005	0.005

2.2 Well Construction Data - R309-113-9 (5)(a)(ii) & (iii)

A copy of the well construction log is included in the Appendices of this report. Well drilling started in July 1962 and was completed in October. The well was drilled to a total depth of 900 feet using a cable-tool rig. It was cased with 8-inch steel casing that was slotted from 819-900 feet. The well was dry until it encountered water in the Wingate Sandstone at 790 feet. The water in the Wingate was under pressure and rose to a level of 745 feet below ground surface (Arnow, 1963).

The well was deepened to 1100 feet in May-June 1966. The only information we have for this construction is a billing for 200 feet of drilling and six hours of bailing to develop the well. Since there are no itemized charges for casing or perforations, we can surmise that it was left as an open hole from 900-1100 feet.

In March-April 2001, the pump, discharge pipe, and electrical cable in the Devils Garden Well were replaced. A 5-HP Sta-Rite,41-stage, submersible pump was installed. The new pump can produce 11-12 gpm from the well.

2.3 Aquifer Data - R309-113-9 (5)(a)(iv)

We have only very limited information regarding any drawdown or recovery tests for this well. Water levels are not routinely monitored. The water level at the time of construction (1962) was either 745 or 755 feet below ground surface. There are conflicting numbers in the report (Arnow, 1963). A test conducted at the well on October 31, 1962 showed that the maximum yield of the well was about 4 gpm. When pumped at 4 gpm, the water level in the well was drawn down below the pump intake at 867 feet. After deepening the well in 1966, the yield increased slightly. Prior to replacing the pump in 2001, the pump that was in the well produced 6 gpm. The well

could be pumped continuously at 6 gpm while filling the 30,000-gallon storage tank without drawing the water level down to the pump intake.

2.4 Hydrogeologic Methods, Procedures, and Calculations - R309-113-9 (5)(a)(vii)

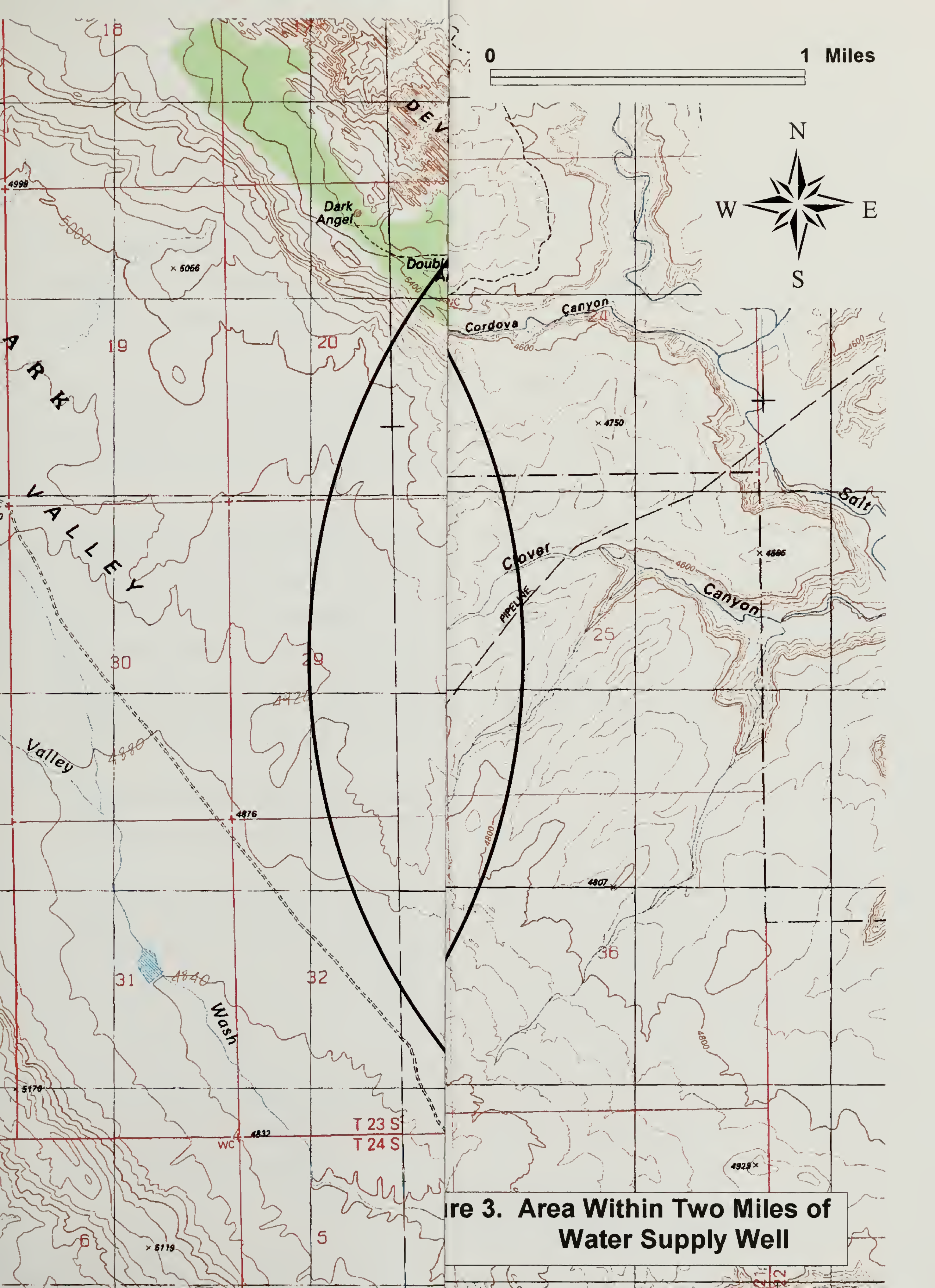
We have insufficient data to make predictions for groundwater travel times to the Devils Garden Well. Therefore, the optional two-mile radius delineation will be used to delineate the wellhead protection area. The only potential contaminant sources within several miles of the well are those associated with National Park Service developments and activities in the Devils Garden area.

2.5 Map Showing Boundaries of the DWSP Zones - R309-113-9 (5)(a)(viii)

Figure 3 is a map showing the area within two miles of the supply well.

2.6 Protected or Unprotected Aquifer Classification – R309-113-9(3) & (6)

The well at Devils Garden does not meet all of the criteria for classification as a protected aquifer, as described in the Utah DEQ guidelines for source water protection plans. The well does not have a grout seal that extends from ground surface to at least 100 feet below ground surface and for a minimum of 30 feet into an impermeable layer. However, from a practical standpoint, the large thickness of relatively impermeable Dewey Bridge Member of the Entrada Sandstone and Kayenta Formation (225 feet) effectively prevent surficial contaminants from infiltrating to the aquifer.



re 3. Area Within Two Miles of Water Supply Well

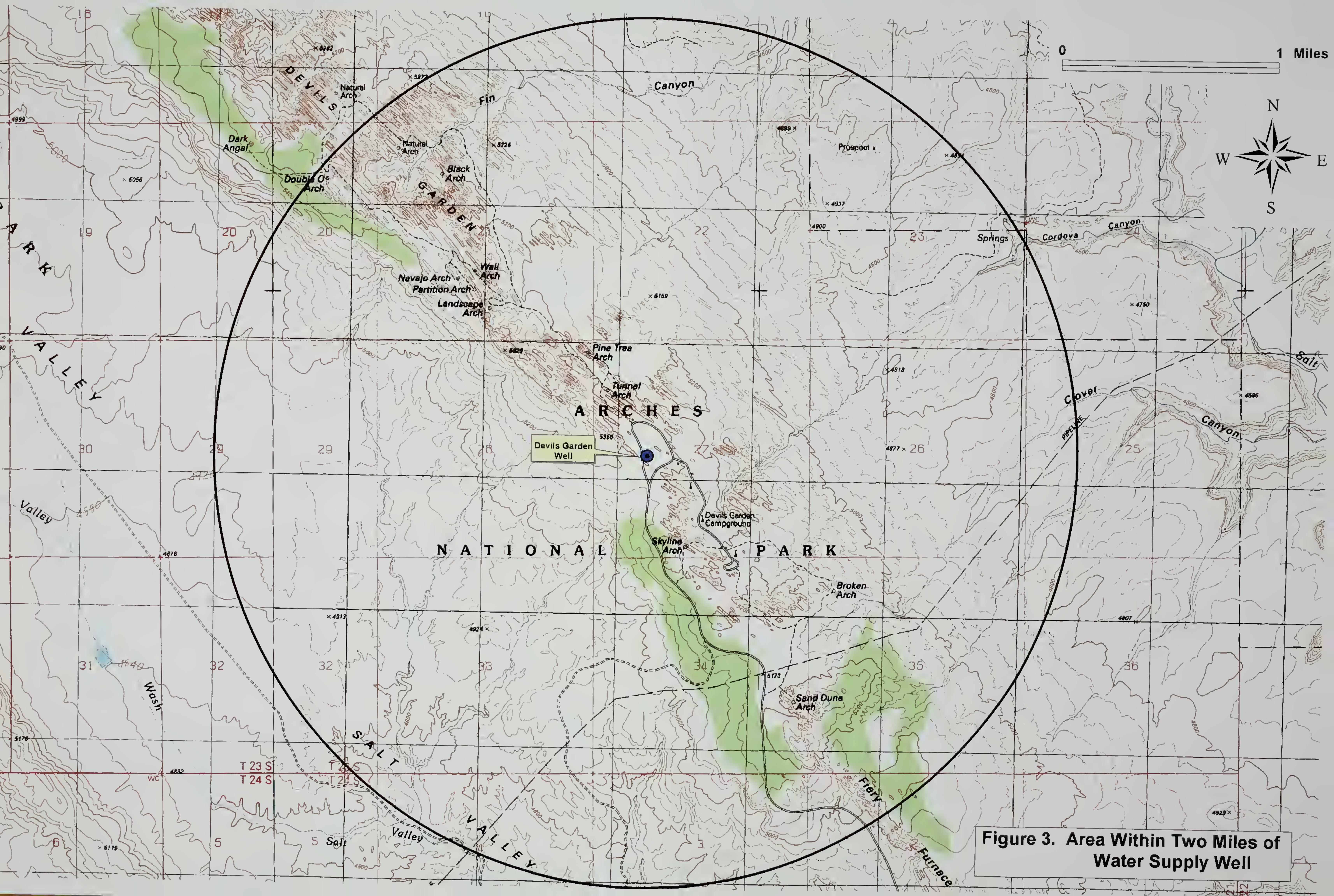


Figure 3. Area Within Two Miles of Water Supply Well

3.0 THE INVENTORY OF POTENTIAL CONTAMINATION SOURCES - R309-113-10

3.1 List Potential Contamination Sources - R309-113-10 (1)

Potential contaminant sources within two miles of the Devils Garden Well include: septic tanks and leachfields, a fuel tank, and small quantities of paint, oil, fuel, solvents, etc. in the generator building.

There are three septic leachfields associated with the Ranger Station and bathrooms at the campground. A new leachfield is planned for construction in 2001 to service a new comfort station at the Devils Garden trailhead.

At the generator building, there are various small containers of oil, antifreeze, solvents, and paint stored on shelves in a building with a concrete floor. A 1000-gallon above ground fuel tank contains diesel fuel for operating the generators. The fuel tank has double-walled steel construction encased in concrete (CONVAULT™). There are three 55-gallon barrels in the building which contain lubricating oil and antifreeze. These barrels have secondary containment vessels.

At the maintenance building, chlorine bleach, cleaning supplies, and paint for use in the Devils Garden Area are stored on shelves in a building with a concrete floor.

There are seven 1000-gallon vault toilets at the Devils Garden trailhead, within about ½ mile of the well.

3.2 Identify Hazards:

Potential contaminant sources, hazardous substances associated with each of the possible potential contaminant sources, and approximate quantities of each hazardous substance are listed in Table 3.

Table 3. Hazardous substances associated with each potential contaminant source

Potential Source	Hazardous Substances	Approximate Quantity
Fuel Tanks	Diesel fuel	One 1,000-gallon tank, above ground.
Maintenance shop	Chlorine bleach Paint	Several 1-gallon containers Various quantities, generally 1-gallon or less, stored in a paint locker
Generator building	Lubricating oil, antifreeze	Several small (1-5 gallon) containers and three 55-gallon barrels
Septic tanks and leachfields. Vault toilets	Sewage	Sewage from the comfort stations at the campground and trailhead

3.3 Prioritize the Inventory - R309-113-10 (1)

The 1000-gallon diesel fuel storage tank is the largest potential contaminant source. The tank has double-walled steel construction and is encased in concrete (CONVAULT™). Contents of the tank are regularly monitored to detect leaks.

Paint, thinner, solvents, fuel, oil, etc. are stored in small containers at the maintenance and generator buildings. These materials are generally stored in small quantities, in areas where leaks could be readily observed, and secondary containment is provided.

Septic tanks and leachfields present a negligible risk to the water supply. Sewage disposal systems have been constructed, and are operated, in compliance with State and local regulations. Septic tanks are pumped on a regular basis. The source aquifer

is approximately 790 feet below ground with several intervening low permeability geologic formations to prevent movement of sewage to the aquifer. The general dip of geologic formations underlying the Devils Garden area is toward the northeast, causing movement of the treated effluent away from the well.

3.4 Potential Contamination Source Location - R309-113-10 (1)

None of the potential contaminant sources are within the Zone 1 protection zone, 100-foot radius from the well. The nearest potential contaminant source is the diesel fuel storage tank, about 400 feet southwest of the well. Fuel, oil, paint, solvents, etc. stored at the maintenance and generator buildings are about 400 feet southwest of the well. The new septic tank and leachfield constructed to serve the comfort station at the Devils Garden trailhead is planned to be located within the Loop Road, but more than 300 feet from the well. The septic tanks and leachfields for comfort stations at the campground are more than 800 feet south of the well.

All potential contaminant sources within two miles of the Devils Garden Well are under the direct control of the National Park Service.

3.5 Potential Contamination Sources Plotted on Map

Potential contamination sources are plotted on the map in Figure 4.

4.0 THE ASSESSMENT OF POTENTIAL CONTAMINATION SOURCE HAZARDS

All potential contamination sources are under the direct control of the National Park Service. Potential contaminants at the Park are located primarily at the maintenance

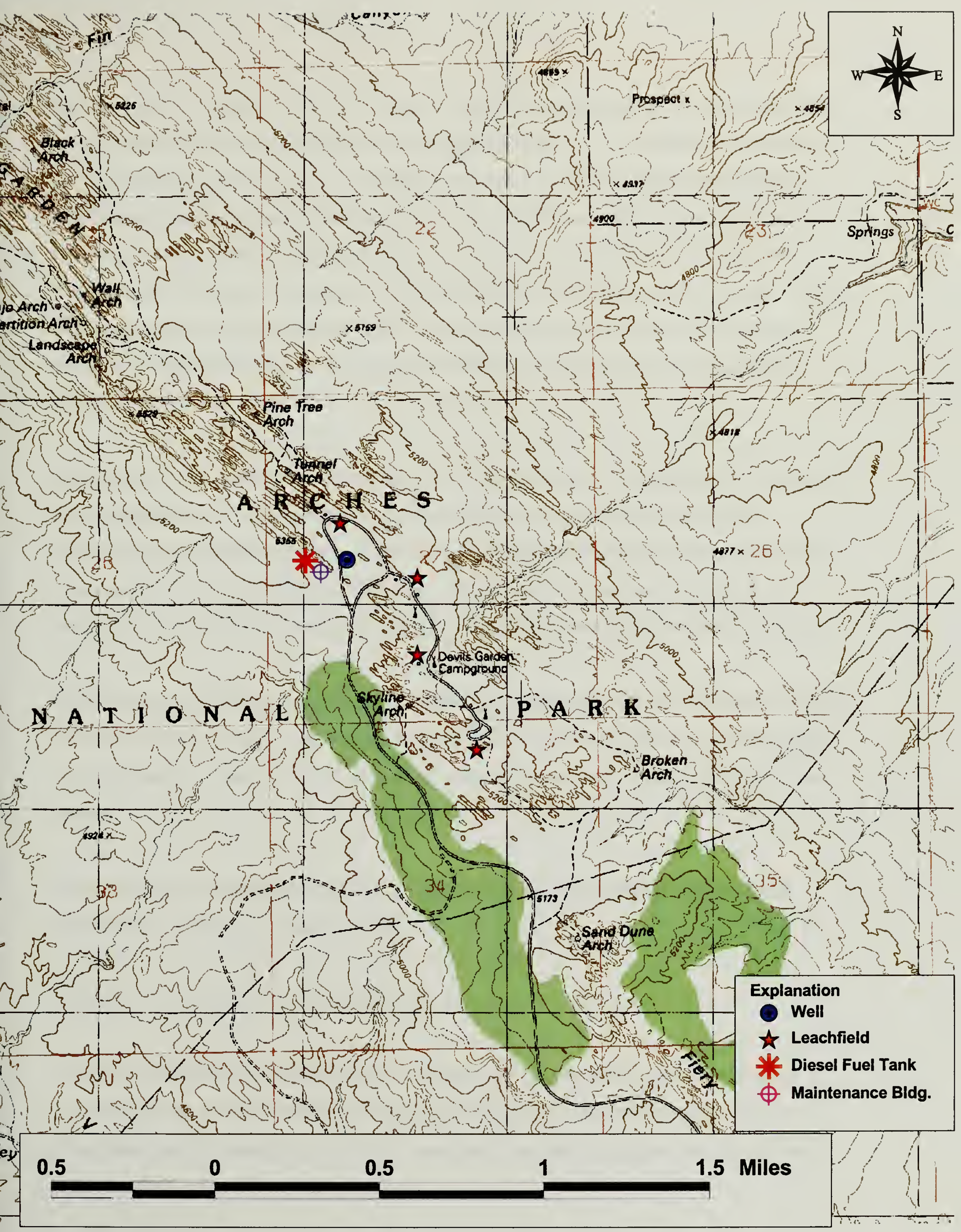


Figure 4. Potential Contaminants in the Devils Garden Area

and generator buildings. The 1000-gallon diesel fuel storage tank is constructed with double steel walls and encased in concrete (CONVAULT™). Solvents, degreasers, paint, lubricating oil, antifreeze, and similar materials (which might be classified as hazardous) are purchased and stored in small quantities, reducing the potential for release of large quantities of contaminants. The Park will continue to follow Best Management Practices to prevent or control release of potential contaminants. These practices include routine monitoring of fuel storage tanks, secondary containment vessels for fuel tanks and oil drums, and eliminating large inventories of potential contaminants

Septic tanks and leachfields are constructed and operated in compliance with State and local regulations. Hydrogeologic conditions (including depth to groundwater, intervening impermeable layers, and geologic dip) make it unlikely that contaminants could reach the source aquifer. However, since septic systems are designed to discharge, they must remain classified as uncontrolled potential contaminant sources.

Secondary containment vessels are provided for oil and fuel storage containers. Paint, solvents, cleaning fluids, and similar materials are stored on shelves in buildings with concrete floors. There are no floor drains in areas where potential contaminants are stored.

Paint, solvents, cleaning fluids, etc. are purchased on an as needed basis. Only negligible quantities are stored on site.

Spill kits are on site to facilitate immediate response if a spill does occur.

Potential contaminant sources listed in Table 3 are adequately controlled through a combination of hydrogeologic conditions and regulatory, operational, physical, and negligible quantity controls. No further land management strategies will be planned or implemented, unless conditions change.

5.0 THE MANAGEMENT PROGRAM FOR EXISTING POTENTIAL CONTAMINATION SOURCES - R309-113-11

Existing regulatory, operational, physical, and negligible quantity controls are adequate to prevent the accidental spill or release of potential contaminants.

6.0 THE MANAGEMENT PROGRAM FOR FUTURE POTENTIAL CONTAMINATION SOURCES - R309-113-12

6.1 Management Program - R309-113-13 (4)

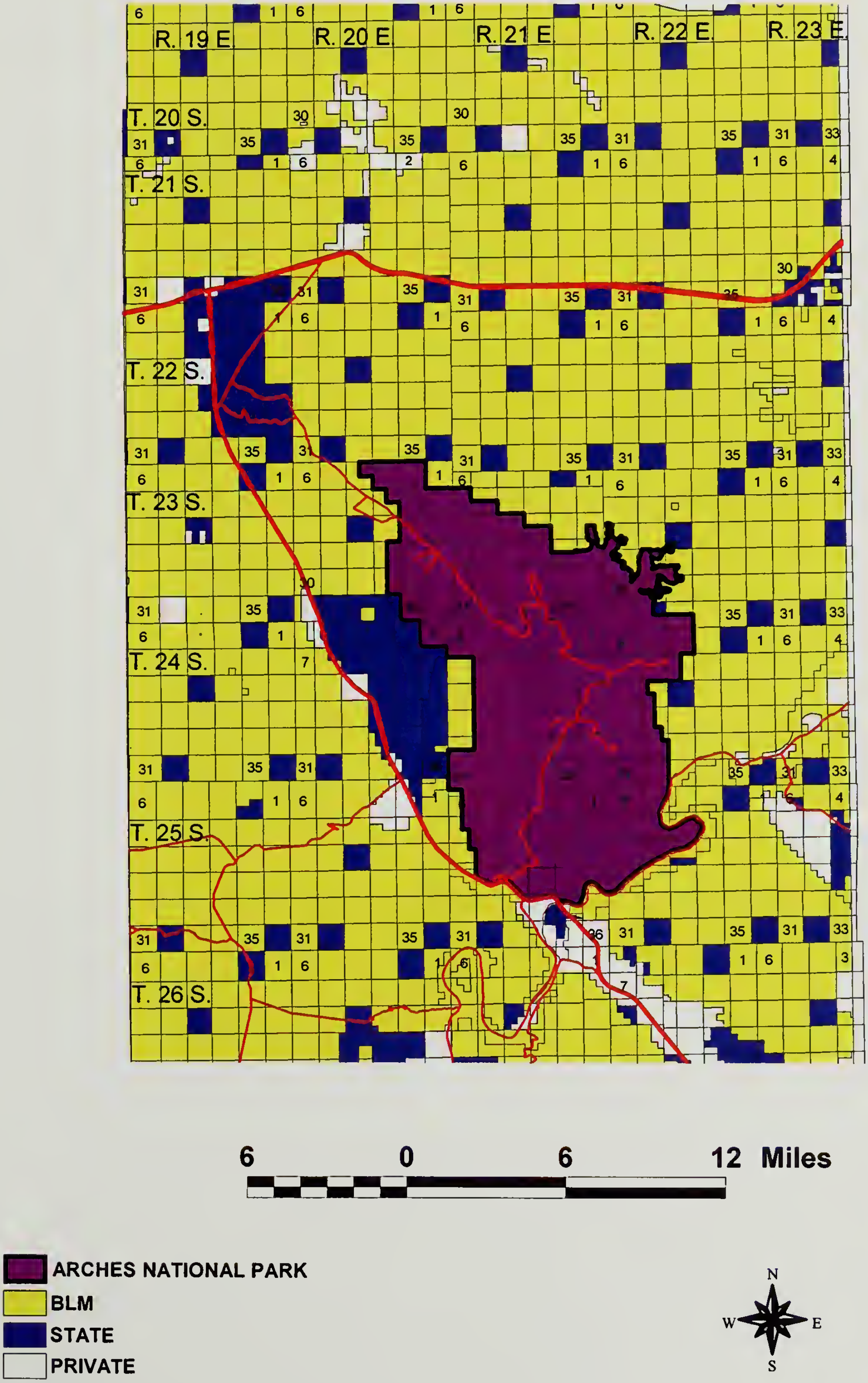
If there are any proposed changes to current land use and land management practices within two miles of the well, the National Park Service will review those proposed changes to determine whether the proposed changes might have a deleterious impact on the water supply for the Park. No such changes are anticipated, as the area is remote and rural. All land within two miles of the well are owned and managed by the National Park Service.

All land within six miles west, south, and east of the Devils Garden Well is owned and managed by the National Park Service. The park boundary is approximately two miles north of the well. Most of the land beyond the park boundary is managed by the Bureau of Land Management and used for cattle grazing. Property ownership near Arches National Park is shown in Figure 5.

If any new potential contaminant sources are planned for the area in the future, the National Park Service will evaluate each source. This assessment will include;

- Determine whether it actually is a potential contaminant source.
- If it is, add it to the inventory.
- Identify and assess its controls.

Figure 5
Arches National Park
Property Ownership



- Plan and implement land management strategies, if the potential contaminant is not adequately controlled.

7.0 THE IMPLEMENTATION SCHEDULE - R309-113-7 (1)(e)

No new land management strategies will be implemented under this plan. Current management practices are adequate to protect the groundwater resources at the Devils Garden Well, which supplies all National Park Service facilities in the Devils Garden area.

Contents of the fuel storage tank are checked weekly by “sticking” the tank. The fuel tank is above ground and the area is visually inspected daily. The maintenance area and generator building are visually inspected daily to detect any leaks or spills from containers stored in these areas. Secondary containment is provided for all containers of oil, antifreeze, etc., in the generator building. The three septic tanks at the campground are pumped twice a year, spring and fall. Vault toilets at the Devils Garden trailhead are pumped on an as-needed basis.

8.0 THE RESOURCE EVALUATION - R309-113-7 (1)(f)

No additional financial resources are necessary to implement this source water protection plan.

9.0 THE RECORDKEEPING SECTION - R309-113-7 (1)(g)

All monitoring records, as-built construction drawings, water quality and water use data, etc., are kept in the office of the Facility Manager at the Maintenance Shop at Arches National Park.

This plan was developed by National Park Service staff. The plan will be reviewed and updated, as necessary, in 5 years, August 2006.

10.0 THE CONTINGENCY PLAN - R309-113-14

It is unlikely that the source aquifer for the Devils Garden Well would become contaminated. If it did become contaminated, water could be hauled from the Arches Headquarters well to allow operations at Devils Garden to continue at current or reduced levels. Alternatively, potable water supplies at Devils Garden could be eliminated, forcing park visitors to bring their own water with them.

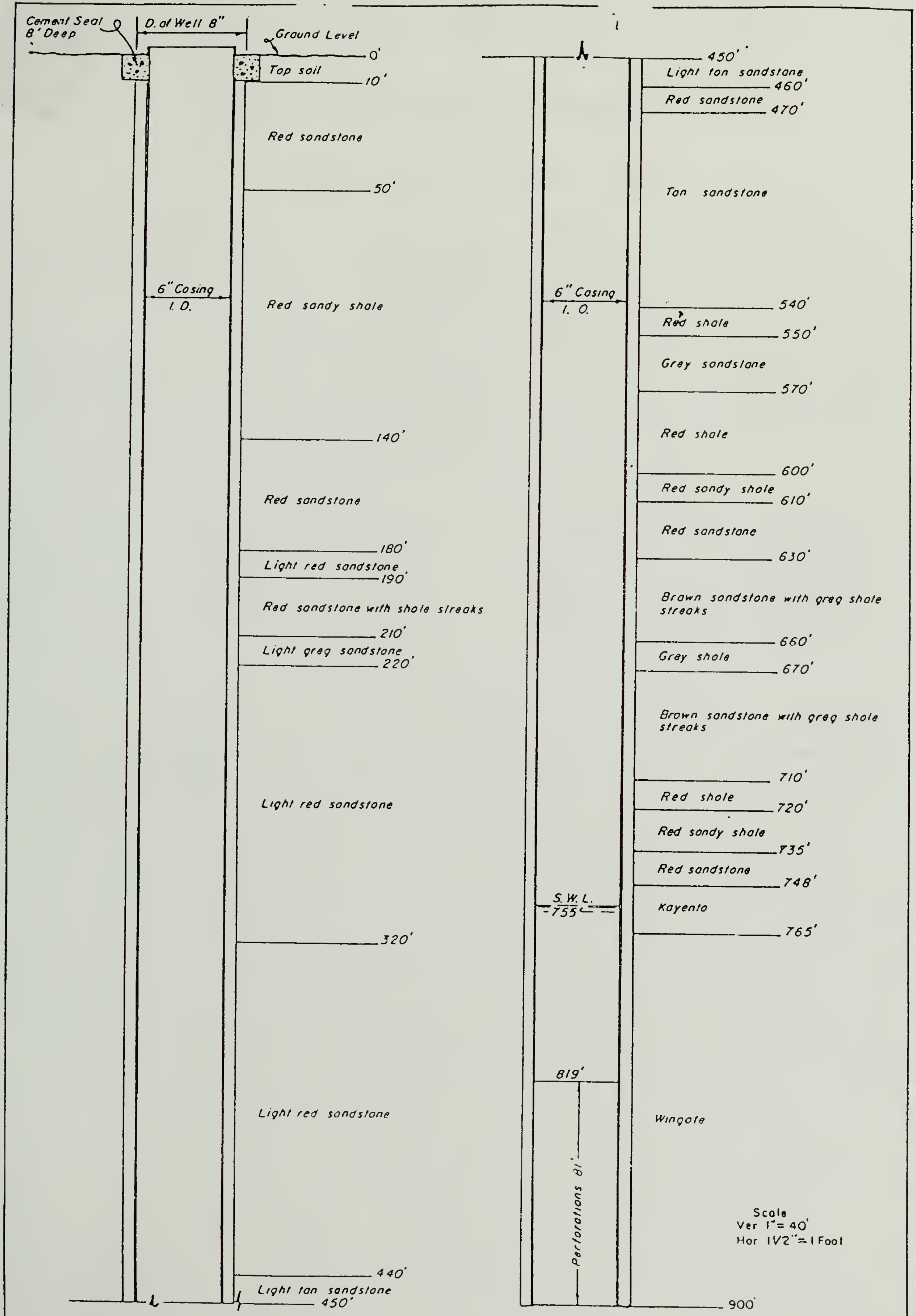
References

Arnow, Ted, 1963, “Test Well in the Devils Garden Area, Arches National Monument, Utah”, USGS Administrative Report, 5 pp.

Lofgren, Ben E., 1954, “Memorandum Ground Water Report at Devils Garden, Arches”, USGS unpublished report, 2 pp.

Utah Division of Drinking Water website, http://www.deq.state.ut.us/eqdw/Index.html

Appendices



Application No. 34321

WELL LOG

Devil's Garden Well
Started July 6, 1962 & Completed Nov. 5, 1962
By Sexton Bros. Drilling Company
ARCHES NATIONAL MONUMENT

By L. Sanda 3/10/65

AH DIVISION OF DRINKING WATER

PUBLIC WATER SUPPLY INFORMATION SYSTEM
01/11/01

WATER SYSTEM NUMBER: 10022

```
   NAME:  ARCHES NP/DEVIL'S GARDEN          RATING:                 APPROVED        POPULATION:
  OWNER:  NATIONAL PARK SERVICE             RATING ASSIGNED:        04/09/96        RESIDENTIAL CONN.
ADDRESS:  PO BOX 907                        INVENTORY REVIEWED:     07/11/00        OTHER CONNECTIONS.
          MOAB UT        84532              INVENTORIED BY:      HANSEN             TOTAL NO. CONNECTIONS
   AREA:  MOAB                              LAST SURVEYED:          06/28/99        TYPE OTHER CONN:  NO CLASSIFICATI
 COUNTY:  GRAND                             SURVEYED BY:         ADAMSON            OUTSIDE USE PERMITTED:          YE
   TYPE:  NATIONAL PARKS & REC.             LAST PLAN APPR.:         /  /           CALC PEAK DEMAND (GPD).
 MANGR.:  ROD ROBEY                         SYSTEM ENGINEER:     N.P.S.             GPD/1440 = DEMAND (GPM)
  PHONE:  719-2250                          BEGIN OPERATION:          04/01         PEAK HOURLY DEMAND:
  OPER  :                                   END OPERATION:            09/30
  PHONE:      -

-BACTERIOLOGIC QUALITY-      - - - - -STORAGE- -   - -     - - - TREATMENT- - - -       - - - - - DISTRIBUTION - - - -
SAMPLES REQ/QUAR.:      1    NUMBER OF UNITS.        1     TYPE:  NONE                  PUMP/GRAVITY:              GRAVIT
QUAR. INSUF. SAMPLS:    0    MATERIAL:           STEEL     PLANT:                       FIRE HYDRANTS:                 YE
QUAR. UNSAT RESULT:     0    CAPACITY.          30,000     CAPACITY (MGD):     .48      PRESSURE ADEQ.:                YE
RECORD SATIS.:        YES    ADEQUATE:             YES     INSTALLED:         1985      PCT METERED:
12 MOS END.:     12/31/99                                                               MASTER METER:                  YE

                                                                SOURCE                                   SOURCE LOCATION
        SOURCE                            - WELL - -    YIELD   PROT.                               -LATITUDE -   -LONGITUDE-
 * NO.   TYPE        SOURCE NAME       TYPE     DIA     (GPM)   CONCUR   TYPE OF TREATMENT          DEG MIN SEC   DEG MIN SEC
   01   WELL (GW)   DEVILS GARDEN      DEEP      6        15             NONE                                .             .
```

01/19/01

Water Quality Measurements For Corrosion Control

ARCHES NP/DEVIL'S GARDEN

Source Name	Source #	Lab Number	Date Collected	pH	Alkalinity (mg/L)	Tot Fe (mg/L)	Tot Mn (µg/L)	Turbidity (NTU)	Ca (mg/L)	Total Hardness (mg/L)	TDS (mg/L)	Specific Conductance µmho/cm	Chloride (mg/L)	Sulfate (mg/L)	Phosphorous as P (mg/L)
DEVILS GARDEN	01	E993130	09/20/99												
DEVILS GARDEN	01	C975783	06/24/97												
DEVILS GARDEN	01	C966307	07/22/96												
DEVILS GARDEN	01	C948731	08/16/94												
DEVILS GARDEN	01	C913938	06/17/91	8	169	< 0.02	5	0.2	29	192	280	499	36	38	<0.01
DEVILS GARDEN	01	C882682	05/16/88	8.3	176	0.05	5	0.7	26	180	302	514	37	36	<0.01
DEVILS GARDEN	01	C871610	03/24/87	7.9	179	0.02	5	0.3	31	213	282	503	36	38	<0.05
DEVILS GARDEN	01	C871611	03/17/87											38	
DEVILS GARDEN	01	C841136	04/12/84	7.8	175	< 0.03	15	0.6	27	184	268	525	36	36	<0.01
		Recommended Limit :				0.3	50	5.0		400	500		250	250	

Summary of Chemical Quality (Form 1)

ARCHES NP/DEVIL'S GARDEN

System Number	Date Collected	Source #	Source Name	In Use ?	Lab Number	Total Arsenic (µg/L)	Total Antimony (µg/L)	Beryllium (µg/L)	Total Cadmium (µg/L)	Cyanide (µg/L)	Turbidity (NTU)	Dissolved Iron (µg/L	Total Iron (mg/L)	Total Managanese (µg/L)
10022	09/20/99	01	DEVILS GARDE	I	E993130									
10022	06/24/97	01	DEVILS GARDE	I	C975783									
10022	07/22/96	01	DEVILS GARDE	I	C966307									
10022	08/16/94	01	DEVILS GARDE	I	C948731									
10022	06/17/91	01	DEVILS GARDE	I	C913938	< 5			< 1		0.2		0.02	5
10022	05/16/88	01	DEVILS GARDE	I	C882682	< 1			< 1		0.7		0.05	5
10022	03/24/87	01	DEVILS GARDE	I	C871610	< 1.1			< 1		0.3		0.02	5
10022	03/17/87	01	DEVILS GARDE	I	C871611									
10022	04/12/84	01	DEVILS GARDE	I	C841136	2.5			< 1		0.6		0.03	15
Primary or secondary drinking water limit :						50	6	4	5	200	5	300	0.3	50

Summary of Chemical Quality (Form 2)

ARCHES NP/DEVIL'S GARDEN

System Number	Date Collected	Source #	Source Name	In Use ?	Lab Number	Nitrite as N (mg/L)	Nitrate as N (mg/L)	Total Mercury (µg/L)	Dissolved Selenium (µg/L)	Total Selenium (µg/L)	Sulfate (mg/L)	TDS (mg/L)	Thallium (µg/L)
10022	09/20/99	01	DEVILS GARDEN	I	E993130		0.77						
10022	06/24/97	01	DEVILS GARDEN	I	C975783		0.72						
10022	07/22/96	01	DEVILS GARDEN	I	C966307	0.77	0.77						
10022	08/16/94	01	DEVILS GARDEN	I	C948731	< 0.02							
10022	06/17/91	01	DEVILS GARDEN	I	C913938	< 0.01	0.78	< 0.2		< 5	38	280	
10022	05/16/88	01	DEVILS GARDEN	I	C882682	< 0.01	0.79	< 0.2		< 0.5	36	302	
10022	03/24/87	01	DEVILS GARDEN	I	C871610	< 0.01	0.77	< 0.1		< 0.5	38	282	
10022	03/17/87	01	DEVILS GARDEN	I	C871611		0.8				38		
10022	04/12/84	01	DEVILS GARDEN	I	C841136	< 0.01	0.78	< 0.1		< 0.5	36	268	
Primary or secondary drinking water limit :						1	10	2	50	50	500	1000	2

COMFORT STATION #2 DEVILS GARDEN CAMPGROUND
JAMES EVANOFF
ARCHES NATIONAL PARK
MOAB UT 84532

UTAH STATE HEALTH LABORATORY
Environmental Chemistry Analysis Report

escription: COMFORT STATION #2 DEVILS GARDEN CAMPGROUND
ite ID: Source: 00
ost Code: 361B
ab Number: 8702326 Type: 04 Date of Review and QA Validation
ample Date: 87/04/25 Time: 08:00 Inorganic Review: 87/05/22
ot. Cations: 98 Organic Review:
ot. Anions: 193 me/l Cations: 5.6 Radiochemistry Review:
rand Total: 291 me/l Anions: 5.4 Microbiology Review:

aboratory Analyses

H	8.3		TSS	<3	mg/l
mmonia N	<0.05	mg/l	Calcium	28	mg/l
hrom Hex	<5.0	ug/l	Magnesium	32	mg/l
otassium	6	mg/l	Sodium	32	mg/l
icarbnate	206	mg/l	Carb. Diox	1	mg/l
arbonate	2	mg/l	Chloride	37	mg/l
luoride	0.22	mg/l	Hydroxide	0	mg/l
itrate N	0.89	mg/l	Nitrite N	<0.01	mg/l
hos Ortho	<0.005	mg/l	SiO2	9	mg/l
ulfate	38	mg/l	Tot. Alk.	173	mg/l
. Hardns.	201.5	mg/l	Turbidity	0.38	NTU
p. Cond.	523	umhos	TDS @ 180C	280	mg/l
-Arsenic	<1.1	ug/l	T-Barium	0.063	mg/l
-Cadmium	<1	ug/l	T-Chromium	<5.0	ug/l
-Copper	<20.0	ug/l	T-Iron	<0.02	mg/l
-Lead	<5.0	ug/l	T-Manganes	<5.0	ug/l
ercury	<0.1	ug/l	T-Selenium	<0.5	ug/l
-Silver	<2.0	ug/l	T-Zinc	260.0	ug/l
O3 Solids	104.0	mg/l			

DOES NOT EXCEED
DRINKING WATER
STANDARDS.

or consultation or assistance, please call the Bureau of Drinking Water/
anitation at 538-6159